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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/992,272	11/14/2001	Robert C. Ruhl	XX0163US (#90575)	9944

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EXAMINER

PARSONS, THOMAS H

ART UNIT PAPER NUMBER

1745

DATE MAILED: 04/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/992,272

Applicant(s)

RUHL, ROBERT C.

Examiner

Thomas H Parsons

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 November 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 November 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Specification

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The Abstract of the instant specification exceeds the range of 50 to 150 words. Accordingly, the instant abstract should be shortened as appropriate.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: reference sign "24", as mentioned on page 8, line 7. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Double Patenting

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686

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F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1, 2, 4-8, 11 and 13-17 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 3-10 and 12-15 of copending Application No. 10/671,902. Although the conflicting claims are not identical, they are not patentably distinct from each other because

Claim 1: Claim 1 of copending Application No. 10/671,902 discloses an electrochemical system adapted to operate between a fuel cell mode, an electrolysis mode, and a mode alternating between said electrolysis mode and said fuel cell mode operating on a fuel gas mixture and an oxygen-containing gas mixture, said system comprising:

at least one hollow planar cell arranged to form an electrochemical stack, said stack including an electrical contact structure at each end of said stack;

an electronically conductive, substantially impervious, hollow planar separator for separating each cell from an adjacent cell within said stack and electrically connecting each cell to an adjacent cell;

a hollow planar, substantially impervious, electrolyte within each cell;

a hollow planar fuel electrode contacting said electrolyte, said electrode being on one side of the electrolyte;

a hollow planar oxygen electrode contacting said electrolyte and on the opposite side of electrolyte from said fuel electrode;

an electronically conductive fuel diffusion layer contacting said fuel electrode, said fuel diffusion layer adapted to allow fuel and oxidized fuel transport via gaseous diffusion between the edge of said layer and said fuel electrode;

an electronically conductive oxygen diffusion layer contacting said oxygen electrode, said oxygen diffusion layer adapted to allow oxygen transport via gaseous diffusion between the edge of said layer and said oxygen electrode;

a first seal preventing said oxygen-containing gas mixture from accessing said fuel electrode and said fuel diffusion layer; and

a second seal preventing said fuel gas mixture from accessing said oxygen electrode and said oxygen diffusion layer.

Because the claims of the instant specification are broader in scope than those of the copending Application, and because of the transitional phrase “comprising”, the claims of the instant specification would obviously encompass other unrecited structure such as the fuel chamber and air chamber, a tapered oxygen diffusion layer and a tapered fuel diffusion layer, and electrodes having an inner and outermost edge.

Claim 2: Claim 3 of copending Application No. 10/671,902 discloses the electrochemical system of claim 1 wherein said oxygen-containing gas mixture is substantially pure oxygen.

Claim 3: Claim 1 of copending Application No. 10/671,902 discloses a system that is structurally similar to what is instantly claimed. Accordingly, it would be obvious to one skill in the art that the oxygen electrode would be operated on pure oxygen gas in either of said

electrolysis mode or said alternating mode, said pure oxygen gas would flow within said oxygen diffusion layer due to a substantially slight pressure gradient.

Claim 4: Claim 4 of copending Application No. 10/671,902 discloses the electrochemical system of claim 1 wherein said at least one cell has a shape selected from the group consisting of circular, square, rectangular and oval.

Claim 5: Claim 5 of copending Application No. 10/671,902 discloses the electrochemical system of claim 1 wherein said fuel gas mixture comprises steam and hydrogen in each of said modes.

Claim 6: Claim 6 of copending Application No. 10/671,902 discloses the electrochemical system of claim 1 wherein said at least one hollow planar cell is defined by at least one cavity.

Claim 7: Claim 7 of copending Application No. 10/671,902 discloses the electrochemical system of claim 1 further including an additional electrical contact layer applied to at least one side of said separator to improve the electrical contact between the components of said at least one cell.

Claim 8: Claim 8 of copending Application No. 10/671,902 discloses the electrochemical system of claim 7 wherein said additional electrical contact layer is ink comprising finely-divided electrode composition.

Claim 11: Claim 9 of copending Application No. 10/671,902 discloses the electrochemical system of claim 1 wherein said fuel gas mixture flows past each cell substantially in succession thereby performing progressive reaction of said fuel gas mixture and enabling higher conversion efficiency.

Claim 13: Claim 10 of copending Application No. 10/671,902 discloses a solid-oxide fuel cell system adapted to operate on a fuel gas mixture and an oxygen-containing gas mixture, said system comprising:

at least one hollow planar cell arranged to form a fuel cell stack, said stack including an electrical contact structure at each end of said stack;

an electronically conductive, substantially impervious, hollow planar separator for separating each cell from an adjacent cell within said stack and electrically connecting each cell to an adjacent cell;

a hollow planar, substantially impervious, electrolyte within each cell; a hollow planar fuel electrode contacting said electrolyte on one side of said electrolyte;

a hollow planar oxygen electrode contacting said electrolyte and on the opposite side of electrolyte from said fuel electrode;

an electronically conductive fuel diffusion layer contacting said fuel electrode, said fuel diffusion layer adapted to allow fuel and oxidized fuel transport via gaseous diffusion between the edge of said layer and said fuel electrode;

an electronically conductive oxygen diffusion layer contacting said oxygen electrode, said oxygen diffusion layer adapted to allow oxygen transport via gaseous diffusion from the edge of said layer to said oxygen electrode;

a first seal preventing said oxygen-containing gas mixture from accessing said fuel electrode and said fuel diffusion layer; and

a second seal preventing said fuel gas mixture from accessing said oxygen electrode and said oxygen diffusion layer.

Because the claims of the instant specification are broader in scope than those of the copending Application, and because of the transitional phrase “comprising”, the claims of the instant specification would obviously encompass other unrecited structure such as the fuel chamber and air chamber, a tapered oxygen diffusion layer and a tapered fuel diffusion layer, and electrodes having an inner and outermost edge.

Claim 14: Claim 12 of copending Application No. 10/671,902 discloses the fuel cell system of claim 13 wherein said at least one cell has a shape selected from the group consisting of circular, square, rectangular and oval.

Claim 15: Claim 13 of copending Application No. 10/671,902 discloses the fuel cell system of claim 13 further including an additional electrical contact layer applied to at least one side of said separator to improve the electrical contact between the components of said at least one cell.

Claim 16: Claim 14 of copending Application No. 10/671,902 discloses the fuel cell system of claim 15 wherein said additional electrical contact layer is ink comprising finely-divided electrode composition.

Claim 17: Claim 15 of copending Application No. 10/671,902 discloses the fuel cell system of claim 12 wherein said fuel gas mixture flows past each cell substantially in succession thereby performing progressive oxidation of said fuel gas mixture and enabling higher conversion efficiency.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

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4. Claims 9 and 10 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of copending Application No. 10/671,902 in view of Isenberg et al. (5,492,777).

Copending Application No. 10/671,902 does not disclose a supplemental high temperature mass.

Isenberg et al. in Figures 1 and 2 disclose at least one supplemental high temperature mass (energy storage reactors 40, 20) positioned adjacent to the stack and used in combination with said stack during a temperature rise for storing high temperature thermal energy released during said fuel cell mode for later release and during a temperature fall of electrolysis mode for reducing the electrical energy input for electrolysis; and, further wherein the at least one supplemental mass is used to store during a temperature rise a portion of thermal energy released during cooling of a spent fuel stream from operation of said fuel cell mode for later use and during a temperature fall for helping heat said fuel gas mixture of said electrolysis mode to reduce the electrical energy input for electrolysis.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the system of the copending Application by incorporating the supplemental high temperature mass of Isenberg et al. because both are concerned with an electrochemical system adapted to operate between a fuel cell mode, an electrolysis mode, and a mode alternating between said electrolysis mode and said fuel cell mode, and Isenberg et al. disclose a supplemental high temperature mass (energy storage reactors 40, 20) that would have provided a means for efficiently and indefinitely storing energy during off-peak electrical power

demands that later can be reconverted to electrical energy thereby improving the overall efficiency and operations of a power plant to provide on demand power.

This is a provisional obviousness-type double patenting rejection.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claim 12 is rejected under 35 U.S.C. 102(b) as being anticipated by Isenberg et al. (5,492,777).

Claim 12: Isenberg et al. in Figures 1-3 disclose a process for an electrochemical system adapted to operate between a fuel cell mode, an electrolysis mode, and a mode alternating between the electrolysis mode and the fuel cell mode, the alternating mode also being an energy storage system mode,

wherein operation in the fuel cell mode (Figure 2) comprises sending a current of electrons to an oxygen electrode (36) to cause the oxygen electrode to transfer the charge of the electrons to a plurality of oxygen ions, to cause the oxygen ions to pass through an electrolyte (34) to a fuel electrode (32), to cause the fuel electrode to transfer the charge back to the electrons, and to cause the electrons to be transferred to an adjacent cell of the system (col. 7: 32-col. 9: 14);

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wherein operation in the electrolysis mode (Figure 1) comprises sending a current of electrons to a fuel electrode (12) to cause the fuel electrode to transfer the charge of the electrons to a plurality of oxygen ions, the aid oxygen ions being formed by the decomposition of steam into hydrogen, to cause the oxygen ions to pass through an electrolyte to an oxygen electrode (16), to cause the oxygen electrode to transfer the charge of the oxygen ions to the electrons, and to cause the electrons to be conducted to an adjacent cell (col. 6: 1-col. 7: 31); and

wherein operation in the energy storage mode (Figure 3) comprises alternating the system between said electrolysis mode and said fuel cell mode (col. 9: 15-col. 12: 22; and col. 7: 56-61 wherein it states that the system of the invention can be operated in two reversible modes: and electrolysis or energy storage mode and a fuel cell or energy recovery mode; the examiner has construed this teaching as reading on an alternating mode).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas H Parsons whose telephone number is (571) 272-1290. The examiner can normally be reached on M-F (7:00-4:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Patrick Ryan
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Thomas H Parsons
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